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Grafting of *Nepenthes*

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During the last few years, many *Nepenthes* species have come into cultivation worldwide, some for the first time, even as their home ranges shrink under human development. As with any multi-species genus, there are species relatively easy to cultivate and those more elusive. The problems with difficult species can be as numerous as the plants themselves: temperature cycles, moisture levels, and one of the least understood parameters, simulating native soils or providing an appropriate alternative.

Transplanting species narrowly restricted to certain soils into an artificial media frequently results in poor growth, chlorosis (yellowing of the leaves), and eventual death. When such plants are removed from the media, few or no live. Roots are found or the root system is often extremely poor. Growth from seed in these mixes is also difficult with seedlings frequently never growing beyond the cotyledon stage.

If the native soils cannot be duplicated and roots will not survive in exotic media, grafting may be a reasonable alternative. Known from Biblical times, grafting was (and is) used to perpetuate a particularly fine species or cultivar, or to cope with nutritional, disease or pathogenic problems in a soil exotic, or even hostile, to the desired plant. The idea of grafting *Nepenthes* is not new and has been tried locally on several occasions. Most involved using an already established rootstock, and attempting to graft on a scion of the desired species. Invariably the host rejected this material, the reason not being entirely clear. This method should not be entirely rejected and is worthy of experimentation. As an alternate method, both rootstock and scion were taken as cuttings to form a whip graft. The rootstock consisted of two node lateral cuttings in which the dormant eyes were removed. The scion also consisted of a lateral cutting as opposed to a tip, the latter being more prone to rot under mist.

Ideally, the stem diameter of both scion and stock should be similar. A razor blade is used to shape the stems in the manner shown. (Figure 1) and after matching the cuttings the joint is wrapped tightly with plastic grafting tape. Not being self-adhesive

the loose ends are simply tied in a knot. The cuttings are then inserted into the hole made in the bottom of the inverted styrofoam cup and placed under mist.

Common material was used as a first experiment. Plants cut for rootstock are either hybrids or species known for vigor. Size of material to be grafted was matched to rootstock. In this case *N. rafflesiana* onto *N. x mixta*, and *alata, fusca,* and *reinwardtiana* onto *N. alata* common green form. Both scion and rootstock of the above plants are more or less easily cultivated and were used to see if grafting was even feasible in *Nepenthes.*

Cuttings were left on the mist bench until roots were visible under the cup and the dormant eye of the scion began to break, at which point they were potted in a standard mix. After the plants were removed from the mist bench, the tape was left on for roughly four months. When removed, an area of tissue fusion could readily be seen where the graft met. (Photo 2). One problem in the successful graft occurred when the tape was removed. The fused tissue under the tape was used to 100% humidity and nearly pulled apart in the first 24 hours when exposed to ambient air. It would be advisable to replace newly unwrapped cuttings under fine mist for a few days and gradually harden them off to reduce this possibility. Plants must also be staked or supported in several places along the stem to avoid pressure on the graft area.

The results of the first series of grafts was mixed and only 25% successful. This was *N. rafflesiana* on *N. x mixta* rootstock. The amount of roots produced by *N. x mixta* was amazing and showed the effect of hybrid vigor. Growth of this graft has been steady and the plant has produced two upper pitchers of *N. rafflesiana* eight months after being placed under mist on Nov. 1989 (Photo 3).

The other three plants did not succeed for different reasons. Oddly, *alata* on *alata* using the same clone as a control plant did not show tissue fusion and the cutting eventually rotted under mist. The second, *reinwardtiana* on *alata* rooted well and showed some evidence of growth but the scion subsequently became infected with scale insects and died. The rootstock eventually broke another node and is still alive. This in itself is interesting in that the obvious two nodes of the stock were initially destroyed. The third, *fusca* on *alata* was the most frustrating since the graft showed tissue fusion and the scion was showing growth and indeed was starting to flower, when the *alata* rootstock aborted its roots and died.

It should be noted that this is not intended as a cure-all for *Nepenthes* propagation. It is unlikely that *N. rajah* grafted unto *N. x mixta* or *N. dyeriana* would survive all the rigors that these hybrids will tolerate. It is also unclear whether lowland rootstocks would suit highland temperature conditions and in the case *N. fusca* or *N. spathulata* might serve well due to their vigor. It is at least possible that plants whose native soils cannot be duplicated may benefit from this technique. There is still the obvious problem of obtaining the material for grafting. Species that have proven difficult to cultivate are seldom available for experimentation. It is less clear whether the scion will eventually produce basal shoots although this should be possible. All similar shoots on the rootstock should be destroyed to prevent the plant from putting all of its energy toward the stock and aborting the scion. Visions of several exotic species on one rootstock are unlikely, but might be possible.

For the idea to try grafting for its possible benefits, I wish to thank Peter Able of Sydney Botanic Gardens, Australia. Working with species of *Grevillea* endemic to ultra basic soils of New Caledonia and nearly impossible to cultivate elsewhere, he tried grafting onto the easily cultivated native Australian *G. robusta* and the plants not only thrived but grew large, flowered and are now offered as landscape material

I would encourage more experimentation with *Nepenthes.* It is unknown whether they are more or less difficult than other plant species to graft but of several different genera of plants and shrubs I personally have tried, this was the only success. Think what someone skilled in this area could do! How aobut it CPers?

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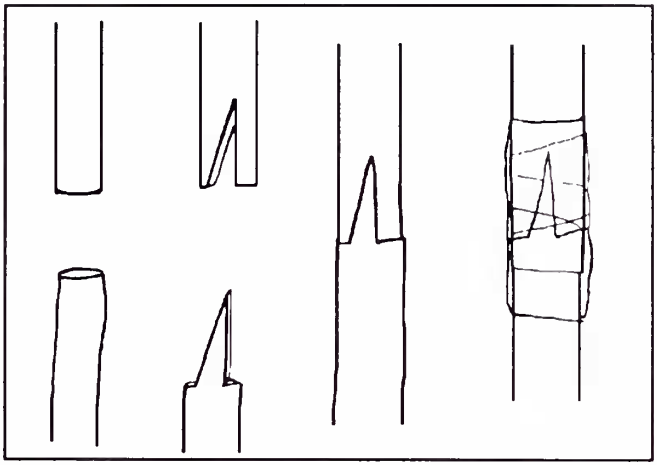

Figure 1. Scion and rootstock showing interlocking cut ends to be joined and wrapped with grafting tape.

Photo 1. Closeup of area of tissue fusion

Photo 2. Overall view of grafted *N. rafflesiana* on *N. x mixta*